ERIC Document Resume	See Instruction Sheet	DATE OF RESUME 8/9/65	DATE RECEIVED

A. PUBLICATION DATA

1. ERIC NUMBER	2. ORIGINATOR CONTROL NO(S).	3. IDENTIFICATION NO.	DO NOT WRITE IN SPACE BELOW
ED000421	7173	N.A.	

4. AUTHOR(S):
Siebring, B. Richard and Schwahn, Duane H.

5. TITLE OF DOCUMENT ABSTRACTED:
Baccalaureate Origins of Ph.D. Physicists

6. PUBLICATION TITLE:
American Journal of Physics

7. EDITOR(S):
N.A.

8. PLACE OF ORIGIN
ORG. Univ. of Wsiconsin
ST. Madison, Wiscinson
CITY, STATE

9. PUBLISHER OR SOURCE
American Institute of Physics
New York, N.Y.

10. VOL.	11. PAGES	12. MO./YR.	13. TOTAL PP.
27	647-648	Dec. 59	2

TELE. EXT.
INST/LOC CODE

MICROFILM COPY AVAILABLE
YES ☒ NO ☐

COPYRIGHT GRANTED
YES ☒ NO ☐

COPYRIGHT RELEASE FILED
YES ☒ NO ☐

TYPE OF REPORT
PROPOSAL ☐
IN-PROGRESS ☐
FINAL ☒
FOLLOW-UP ☐

OTHER ERIC REFERENCES:

ERIC SATELLITE CODE

B. INDEXING DATA

14. SUBJECT AREA

15. TYPE OF ENDEAVOR
survey

16. INDEXING TERMS (6-12)

surveys	physics		
graduate education	demographic factors		
sciecne	technical education	environment (ed.)	

17. ABSTRACT (MAX. 250 WORDS)

Using data gathered by the National Academy of Sciences on the baccalaureate origin of Ph. D. physicists for the periods 1936–45, 1946–50, and 1951–55, the authors of this article found that the undergraduate training of physicists who earned doctorates during the years covered by the study was concentrated in a small proportion of this country's institutions of higher education and that this concentration was increasing. The North Central States lost the lead in the undergraduate training of Ph. D. physicists to the Northeastern States, both numerically and percentagewise. In terms of percentage contribution, the trend is toward the increasing influence of the technical schools rather than the colleges and universities, and the Ph. D.-granting institutions lead the non granting Ph. D. institutions and are increasing their percentage contribution. There is a slow trend from the privately controlled to publicly controlled institutions.

ERIC No.

18. SOURCE OF ABSTRACT

C. FUNDING DATA

19. SUPPORTING ORGANIZATION	20. DIVISION OR DEPT.	21. CONTRACT NO. / PROJECT NO.
	22. TOTAL COST OF PROJECT	
	23. DURATION OR PROJECT	U.S. Department of Health, Education, and Welfare Office of Education

IC Form 1

IV-12

Reprinted from AMERICAN JOURNAL OF PHYSICS, Vol. 27, No. 9, 647–648, December, 1959
Printed in U. S. A.

Baccalaureate Origins of Ph.D. Physicists

B. RICHARD SIEBRING AND DUANE H. SCHWAHN
University of Wisconsin, Milwaukee, Wisconsin

(Received, February 24, 1959)

Using the data gathered by the National Academy of Sciences about the baccalaureate origin of Ph.D. physicists for the periods 1936–1945, 1946–1950, and 1951–1955, the authors detected certain trends in the undergraduate training of Ph.D. physicists. It was found that the undergraduate training of physicists who earned doctorates during the years covered by this study was concentrated in a small proportion of this country's institutions of higher education. This concentration in the top institutions was found to be increasing.

The North Central states lost the lead in the undergraduate training of Ph.D. physicists to the Northeastern states. This is true both numerically and percentagewise. In terms of percentage contribution, the trend is toward the increasing influence of the technical schools (up 4.75%) rather than the colleges (down 5.2%) and universities (up 0.8%). The Ph.D. granting institutions have led the nongranting Ph.D. institutions over this time span and are increasing their percentage contribution. There is a slow trend from the privately controlled to publicly controlled institutions.

IN the last year much has been written and spoken about the training of physicists and scientists in general. Much of this information has been based upon the personal experience of one man or a small group of men, hearsay, opinions, or just plain prejudices. It is the objective of the writers of this paper to present certain facts and trends concerning the undergraduate training of physicists.

The information presented in this paper is based upon statistics gathered by several government agencies. The National Academy of Sciences has compiled information indicating the baccalaureate origins of Ph.D. physicists for the years 1936–1955.[1] It would be futile to hope that not a single person had been omitted in an undertaking of this scope. It is the conviction of the writers, however, that the statistics gathered by this agency are very accurate. Similar data were gathered independently by the American Council on Education.[2] The statistics from these two agencies agree very closely.

The National Academy of Science gathered data over three periods: 1936–1945, 1946–1950, and 1951–1955. Thus it was possible to compare these three time spans to detect certain trends.

The institutions were ranked for each of the three periods as baccalaureate sources for Ph.D. physicists. As one would expect, the majority of the institutions near the top of this list were large universities and technical schools. Notable, however, were the high rankings of such colleges as Oberlin and Swarthmore. This is further evidence of the excellence of the academic programs of these smaller institutions.

When comparing the rankings for the three periods, one noted some obvious shifts in order. Several institutions declined in their positions as baccalaureate sources of Ph.D. physicists in the post-war years; other institutions elevated in rank. Notable among those that improved were Texas University and Harvard University. The former went up from a rank of nineteen in the 1936–1945 decade to the ranks of fourteen and nine for the periods 1946–1950 and 1951–1955, respectively. Harvard rose from a rank of seven in the first period to one and three, respectively, for the later two periods.

The undergraduate training of physicists who earned doctorates during the years covered by this study was concentrated in a small proportion of this country's institutions of higher education. This concentration in the top institutions increased for the later periods. This might be

[1] Nation Research Council, Office of Scientific Personnel, "The Baccalaureate Origins of the Science Doctorates Awarded in the United States 1936–1945, 1936–1950," National Research Council, Washington, D. C., 1955. Information received in private communication from L. R. Harmon, Director of Research, National Academy of Sciences, National Research Council, Office of Scientific Personnel.

[2] American Council on Education, Research Staff on Scientific Personnel, "The Production of Doctorates in Sciences: 1936–1948," American Council on Education, Washington, D. C., 1951.

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education
This document has been reproduced exactly as received from the person or organization originating it. Points of view or opinions stated do not necessarily represent official Office of Education position or policy.

ED000421

interpreted as a general trend or as a temporary shift caused by the war years. Since this concentration was the most evident in the 1946–1950 span, the latter factor seemed to be important. This would seem to indicate that a greater proportion of the graduates of the leading institutions were able to overcome the interruption in training caused by the war years. It is the opinion of the writers that the concentration in the top institutions is a trend that was accelerated by World War II.

The geographic divisions utilized in Table I are those used by the U. S. Bureau of Census: Northeast, North Central, West, and South. The data in this table show that the North Central states have lost the lead in the undergraduate training of Ph.D. physicists to the Northeastern states. This is true both numerically and percentagewise. The North Central states have steadily decreased over these years in the percentage of Ph.D. physicists who took their undergraduate training in these states, while the Northeastern states have increased by about 10%.

The Type classifications used in Table II are universities, colleges, technical institutions, and teachers colleges. An institution classified as a university consisted of a liberal arts college and at least two professional schools; all other institutions which offered a liberal arts course were classified as colleges. A few institutions classified as colleges also offered professional course in one field. Institutions classified as technical and teachers colleges did not offer liberal arts courses.

TABLE I. Geographic distribution of baccalaureate origins of physicists who received their Ph.D.'s during the periods: 1936–1945, 1946–1950, 1951–1955.

Census division	1936–1945 Number	(%)	1946–1950 Number	(%)	1951–1955 Number	(%)
Northeast	381	32.70	440	42.72	957	41.11
North Central	413	35.45	321	31.17	645	27.71
South	184	15.79	136	13.20	366	15.72
West	187	16.05	133	12.91	360	15.46
	1165	100.00	1030	100.00	2328	100.00

TABLE II. Distributions by type of institutions (universities, colleges, technical colleges, and teachers colleges) of baccalaureate origins of physicists who received their Ph.D.'s during the periods: 1936–1945, 1946–1950, 1951–1955.

Type of institution	1936–1945 Number	(%)	1946–1950 Number	(%)	1951–1955 Number	(%)
Universities	644	55.28	575	55.83	1306	56.10
Colleges	355	30.47	283	27.48	588	25.26
Technical colleges	141	12.10	146	14.17	392	16.84
Teachers colleges	25	2.15	26	2.52	42	1.80
Total	1165	100.00	1030	100.00	2328	100.00

TABLE III. Distribution by type of institution (Ph.D. granting or non-Ph.D. granting) of baccalaureate origins of physicists who received their Ph.D.'s during the periods: 1936–1945, 1946–1950, 1951–1955.

Type of institution	1936–1945 Number	(%)	1946–1950 Number	(%)	1951–1955 Number	(%)
Ph.D. granting	641	55.02	617	59.90	1371	58.89
Non-Ph.D. granting	524	44.98	413	40.10	957	41.11
Total	1165	100.00	1030	100.00	2328	100.00

TABLE IV. Distribution by type of institution (public or private) of baccalaureate origins of physicists who received their Ph.D.'s during the periods: 1936–1945, 1946–1950, 1951–1955.

Type of control	1936–1945 Number	(%)	1946–1950 Number	(%)	1951–1955 Number	(%)
Public	432	37.08	407	39.51	964	41.41
Private	733	62.92	623	60.49	1364	58.59
Roman Catholic	27	2.32	21	2.04	78	3.35
Non-Roman Catholic	706	60.60	602	58.45	1286	55.24
Total	1165		1030		2328	

The universities have consistently provided the undergraduate training for 55 to 56% of the physicists who received their doctorates during these years. The colleges have declined by 5%, while the technical institutions have increased by nearly 4%.

The data in Table III show that the Ph.D. granting institutions have led the nongranting Ph.D. institutions over this time span and are increasing their percentage contribution.

Approximately 63% of the 1936–1945 doctorates in physics were granted to individuals who had received their undergraduate training in privately controlled institutions. The data in Table IV indicate, however, that there is a slow trend away from privately controlled to publicly controlled institutions.

124 00063